C 3309

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Sixth Semester

(Regulation 2004)

Mechanical Engineering

ME 1354 — POWER PLANT ENGINEERING

(Common to B.E. (Part-Time) Fifth Semester Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Discuss the essential factors which should be considered while selecting a site for a hydroelectric power plant.

2. List out the inherent advantages of the combined power cycles.

3. State the advantages and disadvantages of pulverised coal firing.

4. What is the function of the cooling tower?

5. What are the micro hydel plants? Why are they important now days?

6. Explain the function of the moderator.

7. What are the applications of diesel electric power plants?

8. Discuss the effect of inter cooling in a gas turbine plant.

9. Mention the advantages and disadvantages of the geo thermal power plant.

10. What are the fixed costs?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Enumerate the advantages and disadvantages of the Steam power plant. (6)

(ii) With neat diagram explain the working principle of the combined MHD-Steam power plant. (10)

Or

(b) (i) Explain with neat sketch the construction and working of a fluidised bed boiler. (8)

(ii) With neat diagram explain the working principle of a modern high pressure boiler used in the thermal power station. (8)

12. (a) (i) Draw an explanatory line diagram of an ash handling system employed in steam power plants and also explain the difficulties encountered in the handling of ash in a thermal power station. (8)

(ii) Discuss the advantages and disadvantages of stoker firing, and explain the working of chain grate stoker with neat sketch. (8)

Or

(b) (i) Explain the working of the electro static precipitator with neat diagram, and give its outstanding features over other dust collectors. (8)

(ii) Describe with the help of neat sketches the working of 'forced draft' and 'induced draft' cooling towers. (8)

13. (a) (i) Describe the boiling water reactor with the help of neat sketch and explain its chief characteristics. (10)

(ii) Discuss the salient features of the nuclear waste disposal. (6)

Or

(b) (i) Enlist the merits and demerits of the water power. (6)

(ii) Sketch a layout of a hydraulic power plant suitable for high heads. Indicate the essential elements in that power plant and explain their functions. (10)

14. (a) Draw and explain the layout of a modern diesel power plant showing the following systems : (16)

(i) Air Intake system

(ii) Cooling system

(iii) Fuel supply system

(iv) Lubrication system and

(v) Exhaust system.

Or

(b) (i) Bring out the difference between the closed cycle and open cycle gas turbine power plants. (6)

(ii) Draw a neat diagram of a regenerative gas turbine power plant having intercooling and reheater, also explain its working with a help of a p-v diagram. (10)

15. (a) (i) Sketch and explain the two pool tidal power plant. (6)

(ii) Describe, With a help of neat sketch the working of a solar thermal receiver system plant and enumerate the advantages and disadvantages of concentrating collectors over flat plat collectors. (10)

Or

(b) (i) What are the elements which contribute to the cost of the electricity, and how can the cost of power generation be reduced? (8)

(ii) Determine the generating cost per unit of 80 MW power station with the following data : (8)

Capital cost = Rs. 160×10^7

Annual cost of fuel = Rs. 32×10^6

Annual wages and taxes = Rs. 36×10^6

Interest and depreciation = 10% of capital cost

Annual load factor = 45%.
